

“Version with Markings to show Changes Made”

In the Claims:

Cancel claim 12.

Claim 1: A reticle with support material of transparent, optically uniaxial crystal, in which the principal axis of said crystal is substantially perpendicular to the surface of said reticle.

Claim 2: A reticle based on MgF_2 as support material, in which the principal axis of said MgF_2 is oriented substantially perpendicular to the surface of said reticle.

Claim 4: The reticle according to claim 1, further comprising a cooling device.

Claim 5: The reticle according to claim 4, in which said cooling device has a flowing fluid.

Claim 7: The reticle according to claim 2, further comprising a cooling device.

Claim 8: An illumination equipment for microlithography comprising:
an illumination system, and
a reticle with magnesium fluoride as support material,
in which said illumination system provides radially polarized light and said magnesium fluoride is oriented with its crystal principal axis substantially in the direction of the optical axis at said reticle.

Claim 9: An illumination equipment for microlithography comprising:
an illumination system,
a reticle with support material of transparent optically uniaxial crystal,

in which said illumination system provides radially polarized light and said support material is oriented with its principal axis substantially in the direction of the optical axis at said reticle.

Claim 10: The illumination equipment according to claim 8 or 9 with a cooling device with a flowing fluid.

Claim 11 (Amended twice): The reticle according to claim [6] 18, further comprising a fluid cooling system.

Claim 13 (Amended twice): The reticle according to claim [10] 19, in which said flat plate comprises crystal.

Claim 14 (Amended twice): The reticle according to claim 13, in which said crystal comprises one of CaF_2 and MgF_2 .

Claim 15 (Amended twice): [The] A pellicle of fluoride crystal.

Claim 16: The pellicle according to claim 15, comprising a fluoride selected from the group consisting of CaF_2 , BaF_2 , or MgF_2 .

Claim 17: A reticle with support material of transparent, optically uniaxial crystal, in which the principal axis of said crystal is oriented perpendicular $\pm 5^\circ$ to the surface of said reticle.

Claim 18 (Amended): A reticle based on MgF_2 as support[ed] material, in which the principal axis of said MgF_2 is oriented perpendicular $\pm 5^\circ$ to the surface of said reticle.

Please add the following new claim 19:

Claim 19: An illumination equipment for microlithography comprising:
an illumination system,

a reticle with an optical axis and support material of transparent optically uniaxial crystal,

wherein said illumination system provides radially polarized light and said support material is oriented with its principal axis substantially in the direction of said optical axis at said reticle,

further comprising at least one flat plate arranged parallel at said reticle, in which a fluid flows between said reticle and said at least one flat plate.

Remarks

Claim Objections

In response to the Office Action mailed June 5, 2001, the claims in this application are presented herewith, together with a marked-up version of the claims showing changes made to claims 11, 13, 14, 15 and 18. These changes overcome the Examiner's claim objections in numbered paragraphs 1 and 2 of the Office Action. We respectfully believe the Examiner meant to refer to claim 15 rather than 14 in numbered paragraph 2.

Claim Rejections 35 USC 112

Claim 13 has been amended to depend on claim 12, thus providing an antecedent basis for "said flat plate."

Claim Rejections 35 USC 103

Claims 1, 2, 8, 9, 17 and 18 stand rejected as being unpatentable over Ito in view of Szarmes.

Valid rejection under 35 USC 103 requires that the cited references motivate the skilled person to combine the references to produce the claimed invention. Ito and Szarmes and Ashida do not direct or motivate the skilled person to combine these references to produce the claimed invention.

First, Szarmes deals with birefringent beamsplitters. The cited property of column 16, lines 23-35, only is a statement relating to birefringent beamsplitters. See column 16, lines 14-22 leading to lines 23-35, or to column 4, lines 6-37, in particular lines 19-20 and lines 30-37 giving design constraints for the c-axis, or to column 6, lines 6-10.

Second, Szarmes in no way specifies the choice of orientation in Applicant's claim 1: i.e. "substantially perpendicular to the surface of said reticle." The disclosure cited in column 16, lines 23-35 refers to Fig. 26 where the c-axis clearly is not perpendicular to the \hat{z} - \hat{x} surface of the crystal.

Claim 1 selects a narrow band of substantially perpendicular orientations, for which preference Szarmes provides no motivation.

Consequently, Szarmes does not provide the additional knowledge the artisan would need to vary Ito to produce the claimed invention of any of claims 1, 2, 8, 9, 17 or 18.

Claims 4, 5, 7, 10-12 and 14 stand rejected as being unpatentable over Ito in view of Szarmes and further in view of Ashida. These claims are patentable because they depend on claim 1, which we respectfully have shown is patentable.

Claim 19: New independent claim 19 restates claims 9 and 12 in independent form. Claim 19 recites "at least one flat plate arranged parallel to said reticle, in which a fluid flows between said reticle and said flat plate."

While Ashida shows fluid (i.e. gas) cooling of a reticle, Ashida does not show an arrangement as claimed in new claim 19. At best, Ashida's Fig. 6 shows a reticle 13 with a pellicle 8 with a gas guiding structure (cover box 31) outside the optical path (see column 3, lines 48-49 and column 4, lines 20-25).

Consequently, claim 19 is new and non-obvious for the quoted feature alone.

Claim 13: Not discussed on the merits, is patentable as reciting patentable claim 19.

Claim 14 is changed to read “one of CaF_2 and MgF_2 ” to make clear that these are alternative materials.

Claims Rejections 35 USC 102(b)

Claims 15 and 16 stand rejected as being anticipated by Kubota et al (Kubota).

Valid rejection under 35 USC 102(b) requires that each feature of a rejected claim be disclosed in a single reference. Kubota does not disclose each feature of claims 15 and 16.

Claims 15 and 16: Kubota, in column 8, lines 12-48, in particular lines 20-22, discloses that MgF_2 may be an antireflection coating on a pellicle.

The basic material of the pellicle in Applicant's claims 15 and 16 is sophisticated organic substance, i.e. a fluoride crystal (claim 15) comprising a fluoride selected from the group consisting of CaF_2 or MgF_2 (claim 16).

A skilled person familiar with the art would not consider a plastic spectacle lens with a MgF_2 antireflection layer - quite conventional - as an anorganic or crystalline material lens.

Claim 15 recites that the body of the pellicle is made of fluoride crystal, not the organic material disclosed in Kubota. Also, a thin film MgF_2 or similar antireflection layer generally is amorphous, not crystalline.

Consequently, we respectfully urge that claims 15 and 16 are novel and non-obvious over the cited art.

Wherefore, further consideration and allowance of the claims as amended is respectfully requested.

Enclosed is PTO-2038 authorizing credit card payment for \$80 for an additional independent claim. Any other fee due by virtue of this filing or this application should be charged to Deposit Account 11-0665 . Any refunds in connection with this filing should be credited to Deposit Account 11-0665. A duplicate of this page is enclosed for this purpose.

Respectfully submitted,

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I hereby certify this correspondence is being deposited with the U.S. Postal Service as a first class mail in an envelope with adequate postage addressed to Commissioner for Patents, Washington, D.C. 20231 on September 5, 2001.

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